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BIOLOGICAL SERIES, No. 7

AUGUST, 1918

THE HAWKS OF THE CANADIAN PRAIRIE PROVINCES IN THEIR RELATION TO AGRICULTURE

by

P. A. Taverner.

UNIVERSITY OF CALIFORNIA
AT LOS ANGELES

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Canada
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The Hawks of the Canadian Prairie Provinces in Their Relation to Agriculture.

BY P. A. TAVERNER.

INTRODUCTION.

The hawks have long been regarded as pariahs among birds and have been killed whenever occasion offered. Poultry-men and game conservators have been especially bitter in their persecution of them. Legislatures have not only refrained from protecting these birds, but in some cases, have placed bounties on their heads. The results have not always been satisfactory and when ailing game which would have been destroyed by the hawks have transmitted their diseases to healthy birds, or rodents or other vermin have increased to plague numbers, we have often had cause to regret hasty action. To-day, when the whole world is straining every nerve to increase the food supply, the status of these birds becomes of even more pressing importance than formerly and it is necessary that their economic effect be scrutinized carefully.

An investigation was made by the United States Department of Agriculture in 1893 and the results embodied in Bulletin No. 3, "The Hawks and Owls in the United States in their relations to agriculture." The examination of some 2,690 stomachs proved that though a few species could be thoroughly condemned, the majority did enough good to counteract the evil they did, and others were altogether beneficial. Since that time much additional information has been gathered which substantiates all the conclusions then drawn. Season and locality enter largely into the subject; a species may be harmful at one season or in one place and beneficial at other times or places where conditions are dissimilar, where other food is available, or other interests are at stake. Considering the great number of hawks that range the prairie provinces and the large interests at stake it seems desirable to point out clearly the economic status of these important species.

In the prairie provinces of Canada there are some sixteen species of Hawks and two Eagles. Some of these are of too rare occurrence to require more than passing notice, but others are common enough to have important economic influence. The hawks can be divided into seven groups, each having common characters that aid in its recognition and reflect its habits: (1) Vultures or carrion eaters; (2) Harriers or marsh and meadow haunters; (3) Accipiters, round-

winged or woodland hawks; (4) Buteos, buzzard hawks or soarers, and Rough-legs; (5) Eagles; (6) Falcons, noble or long-winged chasers; (7) Ospreys or Fish Hawks.

VULTURES.

The vultures are represented by only one species in Canada, the Turkey Vulture *Cathartes aura*. This is sometimes called Turkey Buzzard, though strictly speaking it is not a true buzzard—a term which can be correctly applied only to one of the following groups. It is found in the more southern parts of the prairie provinces, but, as it confines itself strictly to carrion and is unfitted by physical structure for aggression, its effect is neutral or wholly beneficial. There are tales of its picking out the eyes of young lambs, but there is certainly little danger of its doing this unless the mother is unable to put up even a slight show of defence.

The Turkey Buzzard can be easily recognized by its large size (30 inches long) and sooty black colour unrelieved except by the red of its bare, featherless head and neck, which is plainly visible at considerable distances.

HARRIERS.

The Harriers are represented by only one species, the Marsh Hawk (*Circus hudsonicus*). In life it is a rather large-appearing hawk (19-22 inches long), but in the hand the smallness of its body and the lightness of its construction are evident. It has not the strength nor the weight for attacking any but small prey. It beats about over the marshes, meadows, or open fields and subsists almost wholly on mice and such small deer. Occasionally small birds are taken, and small ducks that have been wounded are sometimes attacked by it, but it rarely if ever threatens whole or healthy birds of this size. Young chicks of both wild and domestic species are taken on occasion, but it usually avoids the immediate vicinity of buildings and has not often the courage to stoop on the poultry yard. The young grouse it takes must be counted against it, but as out of 124 stomachs examined only one contained evidence of this, such cases are probably the result of occasional opportunity, rather than regular habit. The number of mice it takes is large and it must be ranked high as a mouser. It is, therefore, a bird that is strictly beneficial and should have every protection.

The Marsh Hawk (Plate I A) when flying exhibits long pointed wings and a long narrow tail. In outline, therefore, it resembles the falcons, but its tail is longer than theirs and its action and habit of flight

very different. It usually flies low, beating, with regularly measured, leisurely strokes, up and down over waste land and low scrub, rising with even sweep to surmount a wooded fence line or copse, and plunging rapidly down again to surprise unsuspecting prey on the other side. The young bird of the year is practically reddish brown all over and the adult female is similar but lighter below with the red less intense. The adult male is nearly pure white below and pearl grey above, with black wing tips. In any plumage the Marsh Hawk can be recognized by its white rump which stands out conspicuously and forms a good field recognition mark, especially in juvenile red plumages.

ACCIPITERS.

The Accipiters are represented by three species. They vary in size from the Sharp-shinned, the smallest of our hawks, with body hardly larger than that of a robin, to the Goshawk, one of the largest and most powerful of the hawks. Normally they are woodland hunters and glide through the open bush, threading its mazes with speed and certainty and taking their prey by hidden approach and sudden surprise. For this purpose, which demands sudden bursts of speed and powerful manœuvring control, they have short rounded wings and long tails, giving an outline that taken with flight habits is quite characteristic. They fly with several quick wing beats and then a short sail and are seldom seen beating about the open, soaring in the air, or, except in migration, far from the vicinity of timbered areas. In spirit they are bold and aggressive and their depredations are serious. The two smaller species, the Sharp-shinned and Cooper's Hawks, subsist almost entirely on small birds, paying little if any attention to mice or rodents. The Goshawk takes larger birds and the larger rodents and other such mammals. These birds have done most to give the other raptorial birds a bad name among poultry raisers and game conservators. The Sharp-shinned is limited by size to small birds and is only indirectly important, but the Goshawk is a confirmed chicken and grouse thief. Its strength, weight, and agility are sufficient to enable it to handle even well grown birds and it has the spirit and fearlessness to use its powers to the full. A Goshawk often makes a daily practice of approaching a particular chicken yard in the shelter of a barn, house, or tree clump and bearing off its prey before the surprised owner can interfere. The Cooper's Hawk, being smaller, cannot do as much harm, but the difference is one of degree only and little can be said in its favour.

The Goshawk is of special interest to the game conservator. Its normal range is along the northern limit of intense cultivation and its usual food is the rabbit or varying hare of the bush land. It is a well

known fact that periodically these hares contract a contagious disease that practically exterminates them over wide ranges of country and which sometimes spreads to the Jack rabbit and other prairie rabbits. Thus the rabbits show a steady annual increase until they become very numerous, then a sudden reduction to very few. In times of rabbit abundance all the flesh-eating animals of the north, including the Goshawk, revel in plenty and increase in number. When this food supply is cut off hunger and starvation is their lot and their attention, rendered keen by need, is turned to sources of supply neglected when easier prey is procurable. At such times grouse of all kinds suffer most severely. The grouse of the northern localities are soon exhausted and the Goshawk and large owls are forced out into new fields. They then come down in the southern prairie provinces in unusual numbers and continue there the work that they began in the north. The winter of 1916-17 was the culminating fatal winter for rabbits and reports came in from throughout southern central Canada of the unusual abundance of "large grey hawks" and "large horned owls." The consequence was that the summer of 1917 was marked by a scarcity of grouse of all kinds—Prairie Chicken, "Square-tails," and Ruffed, Spruce, and Blue Grouse. Had this scarcity been primarily due to overshooting, as would be the first natural conclusion, there would have been occasional small localities which the sportsman had overlooked or had been unable to reach and results would have varied in different parts of the country. Grouse conditions, however, were similar over the whole country and out of the way parts of the Red Deer badlands that are difficult of access and the national parks where no shooting is allowed were as barren of game as the immediate neighbourhood of settlements where sportsmen were plentiful and active. It has been suggested that poisoned grain set out for gophers might have been instrumental in killing the Prairie Chicken. However, it appears from the reports of officers of the United States Biological Survey, who are at work upon the problem of controlling rodent pests, that they have seen no evidence of grouse poisoning from this source and that this group of birds seems extraordinarily resistant to the poisons usually used. Other evidence also proves that this cannot be the primary cause of the grouse disappearance, for they are as scarce to-day in areas where there has been no poisoning of gophers as elsewhere. However, the blame for this destruction should not be placed altogether on the Goshawks as they were helped by the Horned and Snowy Owls and the coyotes, foxes, and lesser vermin. In the early autumn and spring probably the owls mentioned must be considered, but in all likelihood as soon as winter comes with sufficient snow for the grouse to bury themselves in at night the importance of these nocturnal birds is considerably reduced; and though the Snowy Owl is largely a

diurnal hunter, it seems that most of the blame falls rightfully on the Goshawk.

The adult Goshawk (Plate I B) is easily recognized. It is a large hawk (length 22 inches), slate grey all over, vermiculated across the breast with many fine, dark zigzag lines. The young of the year is more difficult to recognize and resembles several other species in general style of coloration. All the accipiters in this plumage are very similar and are most easily separated from each other by size. They are brown above, nearly white below, with many narrow, sharp, dark stripes¹, beginning at the throat and covering all the underparts. There are several light bars across the tail and numerous finer ones displayed on the underside of the spread wing. Several other hawks of entirely different economic status have a similar juvenile pattern, but in no common hawk are the stripings below as sharp, regular, and evenly distributed as in these species.

The Sharp-shinned and Cooper's Hawks (Plate II A) though similar to the Goshawk in the younger stages are different when adult, but are so much like each other as to be scarcely separable by plumage characters. The old birds are dull slate blue above and white below, with the breast and flanks heavily barred with narrow, wavy lines of dull reddish. These two when adult and all three in juvenility are most easily told apart by size. The Sharp-shinned is very little larger than a robin in actual size (length $11\frac{1}{4}$ – $13\frac{1}{2}$ inches) though looking somewhat larger in life owing to large wings and tail. The Goshawk is somewhat larger than a crow (length 22–24 inches) and the Cooper's Hawk (length $15\frac{1}{2}$ –19 inches) is intermediate between the Goshawk and the Sharp-shinned. As the females of all the hawks are larger than the males a large female of a small species may be almost as large as a small male of the next larger one. However, all three are equally obnoxious in proportion to their size and little mistake can be made in killing any of them.

BUTEOS AND ROUGH-LEGS.

The Buteos, Buzzards, or Sluggard Hawks, and the Rough-legs—represented by four species, the Red-tailed, Swainson's, American Rough-legged, and Ferruginous Rough-legged Hawks—are all hawks of the largest size and have with very little reason been blamed for the destruction caused by the accipiters. They are birds of the open and are often seen sailing high in the air where their rounded wings and broad spread tails make them usually quite recognizable as a class. When hunting they come lower down, sailing and leisurely flapping over

¹Stripes run lengthwise of the body; bars run across it.

the meadows and fields much like the Marsh Hawk, though their rounded instead of pointed wings, broad instead of narrow tail, their more leisurely manner, and the absence of conspicuous white rump mark make them easily separable from that species. Their principal food is mice and other small or open ground rodents and they lack the agility necessary for the successful pursuit of more active game. Throughout the prairie provinces they are inveterate gopher hunters and the number of these pests estimated to be taken by them awakens astonishment. During the summer of 1917 the writer was on the Red Deer river, Alberta, where this class of hawks was very numerous. A considerable number were taken and many nests examined none of which showed any indication of other food than gophers. Great numbers were seen daily and without exception all appeared to be engaged in hunting these pests. In a little hollow by one Rough-leg nest was found nearly a bushel of dried scraps and fragments of gophers, the discarded remains of innumerable meals. The number of gophers represented was not counted but must have been several hundred and debris scraps of many more must have fallen over the other edges of the nest ledge, and rolled down the face of the cliff. A conservative estimate of the requirements of a family of these large hawks is surprising in its results. Two adults from spring arrival to birth of young (three months) require a gopher a day, making a total of 90; two adults and four young average three per day for two months, a total of 180; six practically adult birds for one month average one per day each (for growing birds require more food than old), a total of 180. Thus the grand total for one family for the summer season would be 350 gophers. A single gopher under favourable circumstances can and does destroy in the neighbourhood of one bushel of wheat. Supposing that one-tenth of this can be charged against the average gopher we still have some thirty-five bushels of grain as the value of one family of these large hawks. At \$2.20 per bushel, the present price of wheat fixed by the government, this makes the very substantial amount of \$77.

It is true that some of these hawks take an occasional fowl or game bird, but of 630 stomachs examined, of the species under consideration, only 54 (Red-tails) contained fowl or game birds. Of these, 34 were taken in late autumn, winter, or early spring when gophers were not procurable, and the remaining 20 were from eastern localities where gophers do not occur. In the itemized record given, every bird taken in gopher country had fed upon rodent species almost exclusively.

It is evident that in the prairie provinces at least, this group of large hawks is wholly beneficial to the farmer and they should receive every encouragement and protection.

The separation between these four Buzzard Hawks is complicated

by the fact that they all occur in two colour phases, a dark one practically similar in all four species and a light one more or less characteristic for each. In each species all degrees of intermediates exist, making an almost bewildering array of plumages. However, specific identity is of little economic importance as those most likely to be confused are of similar status. In the dark phase the four species are dark brown or nearly black, without any markings. Therefore, all black hawks can be regarded as useful.

The Red-tailed Hawk (length 20-24 inches) (Plate II B) is the largest of American hawks excepting the two Rough-legs. It probably weighs as much as either of these or perhaps more, but owing to its closer feathering it usually appears to be smaller. In most characteristic

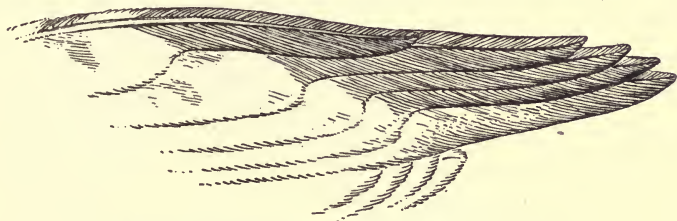


Figure 1. Notched primaries (four) of Red-tail and Rough-leg.

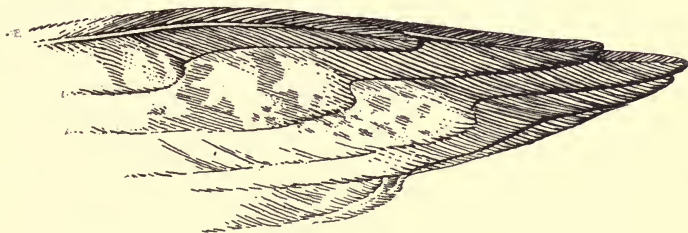


Figure 2. Notched primaries (three) of Swainson's Hawk.

adult plumage it is brown above and white below with a rusty red tail and more or less dark striping on sides of breast. As individuals tend more towards the dark phase the dark flank and breast marks extend and coalesce and the tail is barred with the same colour and often becomes all brown with lighter bars. The typical light juvenile is all brown above, including tail which is barred with lighter, and white below with broad dark stripes on flanks and sides of breast. No reliable colour

distinction can be drawn between this hawk and the next species, Swainson's Hawk, and it may often be confused with it except when it has the red tail. When without this distinguishing mark, and in the black phase, its slightly larger size and the shape of the first primary wing feathers are the only reliable guides. In the Red-tail, the webs of the four outer flight feathers of the wings are suddenly reduced in size as though a shaving had been taken from their edges with a knife (Figure 1), whereas in Swainson's only three are so shaped (Figure 2).



Figure 3. Feathered leg of Rough-leg and Golden Eagle.

Both the Red-tailed and Swainson's Hawks can be told from the two Rough-legs by their legs which are bare of feathers for some distance above the base of the toes (compare with Figure 3).

Swainson's Hawk (length $19\frac{1}{2}$ –22 inches) is slightly smaller than the Red-tail though a large Swainson's measures close to a small Red-tail. Many of the plumages of this bird match very closely some of those of the Red-tail, but the most characteristic is brown above, cream below,

with a brown barred tail, and a decided band of brown across the breast which may have a reddish or even a purplish cast.

The two Rough-legs, sometimes called "Chap" Hawks, are distinguished from all other Canadian hawks by having the legs feathered down to the base of the toes (Figure 3). They are the largest, at least in appearance, of our real hawks, though an examination will show that they have comparatively small and weak feet incapable of holding prey of any strength or size. There are no data available indicating that they ever take birds at all and they seem to confine their attention almost exclusively to the smaller animals and reptiles. The Ferruginous Rough-leg (length 22-24½ inches) is a common breeder in the southern parts of the western prairie provinces. In characteristic light plumage it shows a mixture of reddish and brown above with tail white at base



Figure 4. Narrow bill of American Rough-leg.

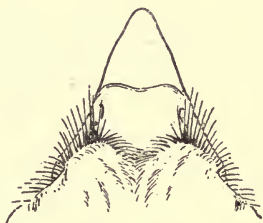


Figure 5. Wide bill of Ferruginous Rough-leg.

reddening toward the tip: it is pure white below with slight dark marking on flanks; the thighs are closely though finely barred with reddish brown. The American Rough-leg breeds in the far north, appearing in the settled parts of Canada only as a migrant. It is a slightly less powerful bird than the Ferruginous Rough-leg and, coming on the prairies after the gophers have holed up for the winter and before they come out in the spring, is of less economic importance. It confines itself to mice and such small vermin, and, therefore, is decidedly useful.

The American Rough-leg (length 20-22 inches) in its most characteristic light plumage is brown above, more or less mixed with lighter tints,

especially towards the head (usually ochres and cream tints with little if any reddish admixture). Below, it is ochraceous dull cream, or white with a pronounced broad black or dark brown band across lower breast and abdomen. The tail is nearly white at the base and brown towards the tip. Between the light and the dark phases of these birds all intermediates exist and often the two Rough-legs are most difficult to tell apart except by a comparison of the bills. Looking down (towards the crown) the bill of the American Rough-leg is comparatively narrow (Figure 4), whereas that of the Ferruginous is much broader at the base giving what might be described as a frog-mouthed effect (Figure 5).

EAGLES.

Eagles are represented by two species—the Bald-headed and the Golden. Size is sufficient to distinguish these birds from all other raptores. Any Canadian bird of prey over 30 inches long from tip of bill to end of tail, or over 6 feet in spread of wings, must be an eagle.

Eagles are nowhere common enough in the prairie provinces to be of economic importance. The tales current of eagles taking lambs and even young children are either exaggerations or the reports of most exceptional cases.

Adult Bald Eagles are easily recognized by their pure white heads and tails, but in the juvenile plumage their even darkness is so like the coloration of the Golden that they are best recognized by their leg characters. The legs of the Golden are always feathered to the base of the toes (similar to Figure 3) whereas those of the Bald are bare from the first joint down.

FALCONS.

The Falcons, Long-winged or Noble Hawks, are represented by five species, none of which, except the Sparrow Hawk, the smallest and least harmful, is at all common and most of them are so rare as to be objects of curiosity rather than of economic interest. The principal characteristics of the Falcons are their pointed, triangular wings and long, narrow tail. Their flight is a succession of quickly timed wing beats, developing high speeds, and with little gliding. The larger members of the group take their prey mostly by straight pursuit, securing it by superior speed and strength rather than by subterfuge. They are the boldest, hardiest, and most sportsmanlike of all the hawks and if they were of more than rare occurrence would warrant uneasiness on the part of the poulterer or the game protector. As it is they can be practically disregarded.

The Gyr Falcon (length 20–22 inches), the most powerful of all the hawks, is of Arctic distribution and comes down very rarely into civilized

sections. The Duck Hawk or Peregrine Falcon (length 16–19 inches) (Plate III B) is considerably smaller and rare everywhere. It requires a water-washed cliff for a nesting site and this limits its summer distribution considerably. The Prairie Falcon (length $15\frac{1}{2}$ – $19\frac{1}{4}$ inches) is similar to the Duck Hawk in habit and is likewise rare or regularly found only in the arid badlands. The Pigeon Hawk is much smaller (length 11– $12\frac{1}{2}$ inches) and breeds in trees. The Sparrow Hawk is the



Figure 6. Toothed bill of falcons.



Figure 7. Untoothed bill of all other hawks.

smallest (length 10–11 inches) and most generally distributed of the falcons. In certain sections a lighter form of the Pigeon Hawk occurs which is known as Richardson's Merlin. It is similar to the above but much lighter, the back of the adult being almost pearl grey and the brown of all plumages much bleached.

The Pigeon Hawk is a small hawk little larger than the Sharp-shinned but more heavily built and with pointed instead of rounded wings. The juvenile is similar in coloration to that species but the markings below are less sharp and more blended. The Pigeon Hawk can be told from the Sharp-shinned in all plumages by the small tooth on the edge of its upper mandible or bill (Figure 6), the cutting edge of the upper mandible of all the hawks except the falcons being smooth and entire (Figure 7). The adult is dark slate blue above with tail barred with black and slate. Below it is white, or creamy with many dark stripings more or less suffused with ochre shades.

The Pigeon Hawk hunts small birds. Its small size prevents it from taking poultry or grouse, except small chicks, and it can have only an indirect effect upon agriculture by reducing the number of weed seed

and insect-eating birds. It takes very few mice and a few insects and its effect can be generally looked upon with indifference.

The American Sparrow Hawk (Plate IV A), next to the Sharp-shinned, is the smallest of our hawks as well as the most beautifully and characteristically marked. The male is bright brick-red on the back and tail, the former barred with dark; the shoulders and crown are slate blue. Below it is white, washed with light reddish tan across the breast where there are numerous round black spots. There are conspicuous black bands across the face in striking contrast to the white background. The female is a duller red on back, shoulders, and tail, also barred with dark, and below is dull cream heavily streaked with rather suffused brown stripes. The face and head carry in slightly subdued form the striking markings of the male.

The principal food supply of the Sparrow Hawk is insects. Of 320 stomachs examined 215 contained insects, mostly grasshoppers, 89 mice, and 53 small birds. The latter were all taken between late autumn and early spring when insects are not available. There are few better friends to the farmer than this little hawk. Wherever there are dead stubs containing old flicker holes in which it can nest this is a common species throughout southern Canada. It should receive every protection and encouragement and it would even pay to put up nesting boxes for it where no natural nesting places are available. The farmer should regard it as a personal damage to himself when one is killed upon his premises.

FISH HAWK.

There is only one Fish Hawk in Canada, the Osprey (Plate IV B). It is too rare over most of the mid-western provinces to be seriously considered here. It lives exclusively upon fish and is seldom found away from the larger bodies of water. The fish it takes are rarely of economic importance and there are no substantial grounds for persecuting it.

It can thus be seen that with the exception of one group, the accipiters, and some rare falcons, the hawks are highly useful, especially in the prairie provinces where small mammals are a serious pest. The crop damage done annually by these little animals is realized by every prairie farmer and thousands of dollars are regarded as well spent in controlling them. Added to the actual crop loss that can be directly traced to them it has been found in California and the southwestern part of the United States that they have been the instruments of the spread of both cattle and human disease. It is well known to-day that some of the worst diseases are spread by means of blood-sucking vermin like

fleas and ticks which are carried by these animals. They not only carry the infected insects from place to place but taking the disease themselves become thereby foci of infection to both cattle and their owners. The gopher question is, therefore, a serious one.

Another pest of the prairie provinces is the coyote which is not only a confirmed chicken killer but a serious menace to sheep raisers. In nearly all the provinces bounties are placed upon its head and one of the sources of income to many prairie dwellers is the bounty and pelt values obtained in reducing its numbers. The natural food of the coyote is gophers and rabbits and any marked reduction in coyote numbers is bound to be reflected in an increase in the number of both these pests. If, therefore, the coyote is exterminated the history of farming in the mid-west will be a constant struggle against an increasing number of gophers unless some other means is found of controlling them. Poisoning when thoroughly done is effectual, but as long as a pair of gophers remain it is only a matter of a few years before they become as numerous as ever.

The hawks, especially the large summer buteos, seem to be the natural substitutes for the coyotes. Being migrating they are present in the southern prairie provinces only in gopher season and show a marked preference for these animals as food. It must not be supposed that hawks can ever entirely exterminate their prey. However, hawks can largely take the place of the eliminated coyote and assist in the control of the pest. They have advantages over human efforts of trap and poison: they are always on the job, they cost practically nothing, they attend to wastes that are sources of infection to cultivated land, and they go automatically where the food is most plentiful and the need for them is greatest. The effect of the noxious hawks upon the prairie chicken and grouse is an indication of what a decided assistance such aids can be when their efforts are beneficial.

The gopher question is a serious one, but the importance of grouse and game should not be overlooked. Though game should not be regarded primarily as a source of food, that use of it should be considered as well as its more legitimate use as a source of healthful sport and recreation. The income derived by dealers, guides, the state, and caterers to the sportsmen, is considerable and not to be disregarded. For every reason the stock of game should be so conserved as to yield its greatest economic usefulness to the country.

However strict we can be in our game laws we cannot keep the grouse steadily up to their maximum numbers when subject to these periodic invasions of birds of prey from the north. Unfortunately, when these birds come down the gophers are holed up for the winter, otherwise we might hail the intruders as mixed evils, for it seems that

most raptorial species prefer fur to feathers when it can be obtained. This is probably more a matter of greater opportunity than taste, but seems to be a fact except in a few exceptional and fortunately rare species.

As these invasions seem to be governed by the rabbit situation more than any other factor there seems to be no means of controlling them. All that can be recommended is to kill as many of the offenders as possible. Probably the crisis of the present cycle is over now. The northern raptores have had two rabbitless seasons and have exhausted the grouse. Following the laws of cause and effect their numbers must also be considerably reduced through lack of food and the forms that they preyed upon will have an opportunity for recovering.

The course here recommended of encouraging and protecting the useful species of hawks and destroying the harmful ones necessitates careful discrimination between the two classes. Unfortunately, the knowledge necessary to distinguish the different species is not widespread and to most people a hawk is a hawk and to be killed at every opportunity. With so much at stake a farmer or sportsman is no more justified in advancing ignorance as an excuse than he is in proclaiming his inability to distinguish between crops and weeds or to know the various insect pests that he has to fight, or the game that the law allows him to shoot. In fact discrimination is a part of his business as farmer or sportsman and as such should be studied.

Until a better knowledge of the usefulness and harmfulness of our birds of prey is more widely distributed the following rule for action can be given for the southern prairie provinces—protect and encourage the larger summer hawks, except those actually caught in the act of poultry killing, and destroy the winter ones when opportunity offers. In this way a few harmful hawks may escape and a few innocent ones suffer, but the results on the whole will be a great step in advance of the present practice of indiscriminately killing friend as well as foe.



A. Marsh Hawk, adult male and juvenile.



B. Goshawk, adult and juvenile.



A. Sharp-shinned Hawk, adult and juvenile. In colour almost indistinguishable from Cooper's Hawk, or in juvenile plumage from young Goshawk.



B. Red-tailed Hawk, adult and juvenile in most characteristic plumage.



A. Swainson's Hawk. Partial light phase and dark phase.



B. Duck Hawk, adult and juvenile.



A. Sparrow Hawk, male and female.



B. Osprey.

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